

# A Taxonomic Revision of the Clavigerine Genus *Microdiartiger* (Insecta, Coleoptera, Staphylinidae, Pselaphinae)

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**Abstract** The clavigerine genus *Microdiartiger* K. Sawada known from Japan is redefined as an independent genus from the allied genus *Diartiger* Sharp. A new species, *M. thinhi* from Vietnam is described.

**Key words:** Pselaphinae, Clavigeritae, *Microdiartiger*, Vietnam, Japan.

The clavigerine genus *Microdiartiger* was defined by K. Sawada (1964) together with a description of the type species *M. japonicus* collected from Mt. Makinoo-san, Osaka Prefecture, Honshu, Japan. This genus was separated from the allied genus *Diartiger* Sharp by having 1) the head and pronotum covered with short and suberect hairs, 2) the elytra with linear microsculpture, and 3) the elongate and simple mid trochanter (spinulate in *Diartiger*).

Besuchet (1986) considered *Microdiartiger* to be identical with *Diartiger*, and surpressed the generic name *Microdiartiger* as a junior synonym of *Diartiger*. Nomura (1997) followed his system and redescribed the type species as *Diartiger japonicus* (K. Sawada).

In the course of my recent studies, a new species of this lineage was discovered from Vietnam. The author concluded that *Microdiartiger* should be revived as an independent genus. In the present study, the genus *Microdiartiger* is redefined with descriptions of a new species and a redescription of the type species *M. japonicus* K. Sawada on the basis of SEM observations. Systematic relationship of these genera is discussed.

## Materials and Methods

The specimens examined for the present study were collected by Tullgren funnel and flight in-

tercept trap (FIT). The type specimen of the new species was collected by FIT which is of the same type as used in Nomura and Idris (2004). Most of the material examined were preserved in dry condition. For detailed examination and dissection, they were washed and dissected in 70% ethanol. Dissections were made using standard techniques, genitalia and small parts were mounted in Canada balsam on a small grass slide on the same pin with the specimen by the method of Maruyama (2004). Leica MZ Apo microscope was used for observation in this study.

For the SEM observation, a specimen of *M. japonicus* was dried, coated with gold, and observed under the accelerating voltage (AV) 10–20 kv by JEOL JSM-6380LV. The other non-coated specimens were examined under lower AV 0.9 kv.

## Genus *Microdiartiger* K. Sawada, 1964

[Japanese name: Hime-higebuto Arizukamushi Zoku]

*Microdiartiger* K. Sawada, 1964: 12. Type species: *Microdiartiger japonicus* K. Sawada, by original designation.

Body small to middle-sized, elongate, broadened in pronotum and abdomen.

Head longer than wide, subcylindrical; clypeus very short; frons convex, strongly narrowed anteriorly; vertex weakly convex; genae strongly projected laterad before eyes; postgenae broad, an-

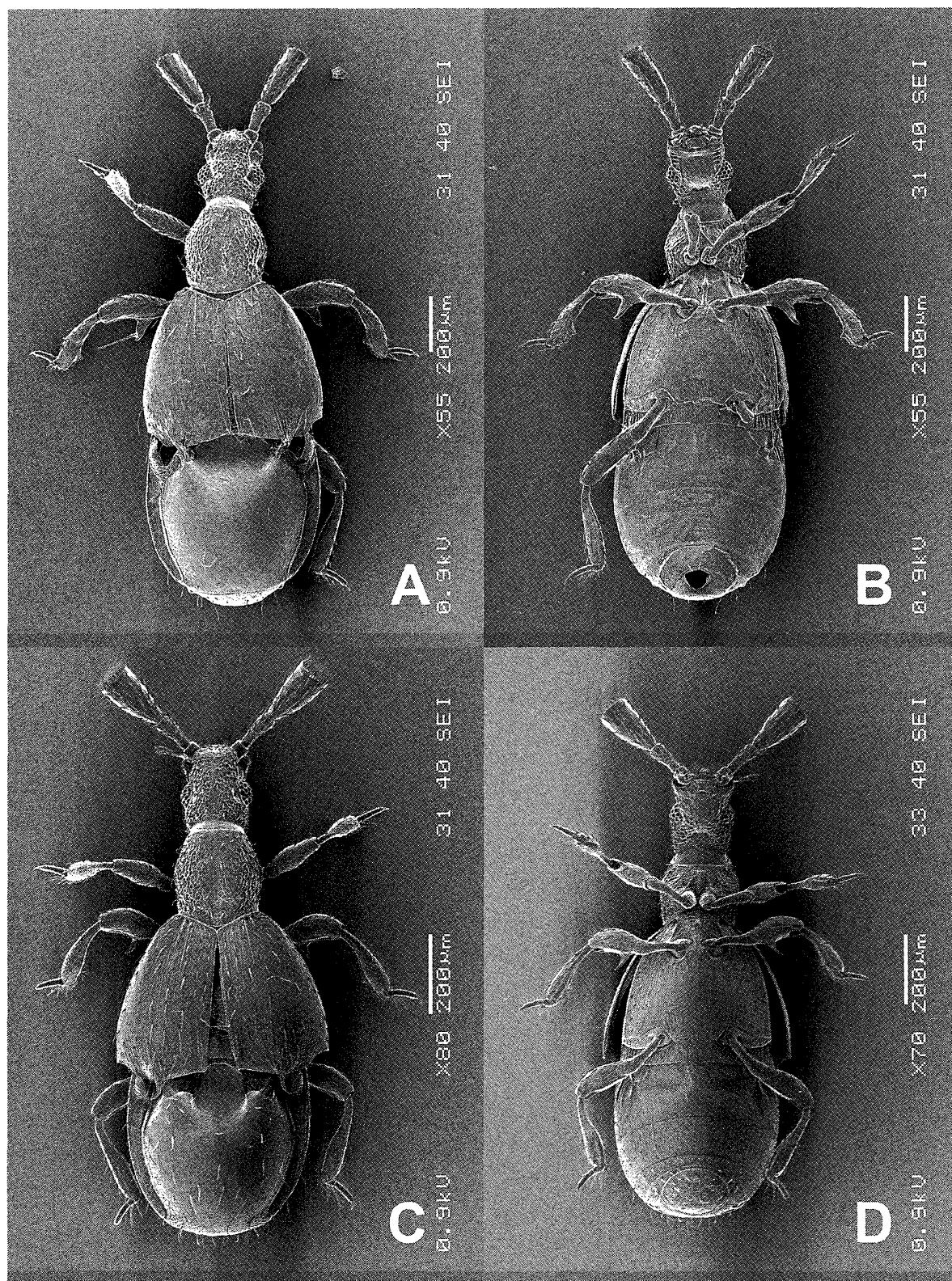
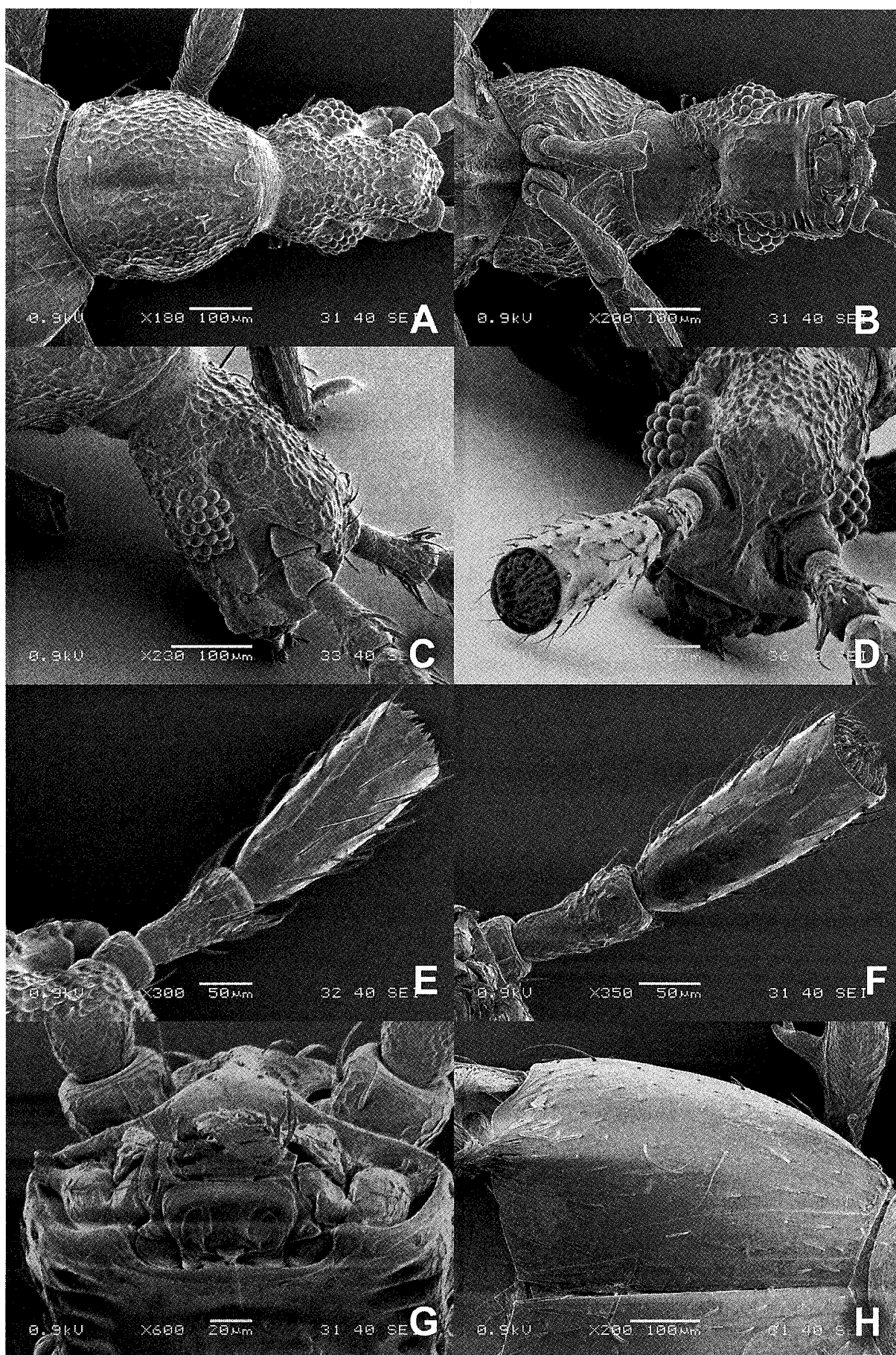


Fig. 1. *Microdiartiger* spp. A, *M. thinhi* sp. nov., male habitus in dorsal view; B, ditto, in ventral view; C, *M. japonicus* K. Sawada, male habitus in dorsal view; D, ditto, in ventral view.

Fig. 2. *Microdiartiger thinhi* sp. nov., male. A, Head and prothorax in dorsal view; B, ditto, in ventral view; C, head in lateral view; D, ditto, in anterior view; E, left antenna in dorsal view; F, right antenna in ventral view; G, mouthparts in ventral view; H, elytra in dorsal view.





gulate in posterior parts. Eyes developed and ovoid. Antennae short and elongate, thickened distally, truncate at apex; segments I and II very short; III longer than wide, weakly broadened distad; IV largest, longer than wide, with a large circular concavity containing short conical setae at apex. Mouthparts put into buccal cavity, reduced, but less than in *Diartiger*; maxillary palpi short and elongate, fusiform in apical part.

Pronotum about as long as head, about as long as wide, subglobose, densely covered with coarse, irregular reticulation on whole surface, sparsely with short suberect setae on dorsal or lateral sides. Elytra slightly wider than long, weakly narrowed anteriad, covered with linear microsculpture on basal, lateral and apical surfaces; each elytron with indistinct basal fovea(e) and longitudinal carinae in mesal part, with a short trichome at apical part. Legs short, thick; mid femora each with a spine on posterior side in male; mid tibiae elongate, each with a denticle near apex in male.

Abdomen very large, about as wide as elytra, weakly convex on dorsal side, rounded on lateral and posterior margins; composite tergum formed by tergites IV to VI very large, strongly concave in basimedial part, with trichomes in basal part; paratergites IV to VI well demarcated, each elongate; tergites VII to VIII each short, narrowed posteriorly; sternites III to VIII well demarcated, each transverse, successively narrowed toward apex.

Male genitalia almost symmetrical; median lobe elongate, narrowed toward apex, divided into basal bulb and apical lobe, with a large elliptical membranous part on basidorsal side.

**Remarks.** The genus *Microdiartiger* is similar to the genus *Diartiger* in having the four-segmented antenna with two large apical segments. However, it is separable by the mid trochanter without spine on the posterior side and the elytra covered with linear microsculpture.

*Microdiartiger* has been synonymized with *Diartiger* by Besuchet (1986). However, *Microdiartiger* should be isolated as an independent genus, because not only it is a monophyletic unit, but also the remaining *Diartiger* is monophyletic. The monophyly of the genus *Microdiartiger* is supported by two autoapomorphic characters: 1) the head and pronotum sparsely covered with thick suberect setae, and 2) the elytra densely with longitudinal linear microsculpture. The two known species of this genus share some common characters, for example, the mouthparts less reduced than in *Diartiger*, though, they are primitive characters.

On the other hand, the monophyly of the remaining *Diartiger* is distinct. It is supported by the following apomorphic characters: 1) the mid trochanters each with a large, strong spine on the posterior side, 2) the strongly reduced mouthparts with the short, hammer-like maxillary palpus (large and fusiform in *Microdiartiger*), 3) the metasternum densely setose along the median line.

### *Microdiartiger thinhi* sp. nov.

(Figs. 1A, B, 2–4)

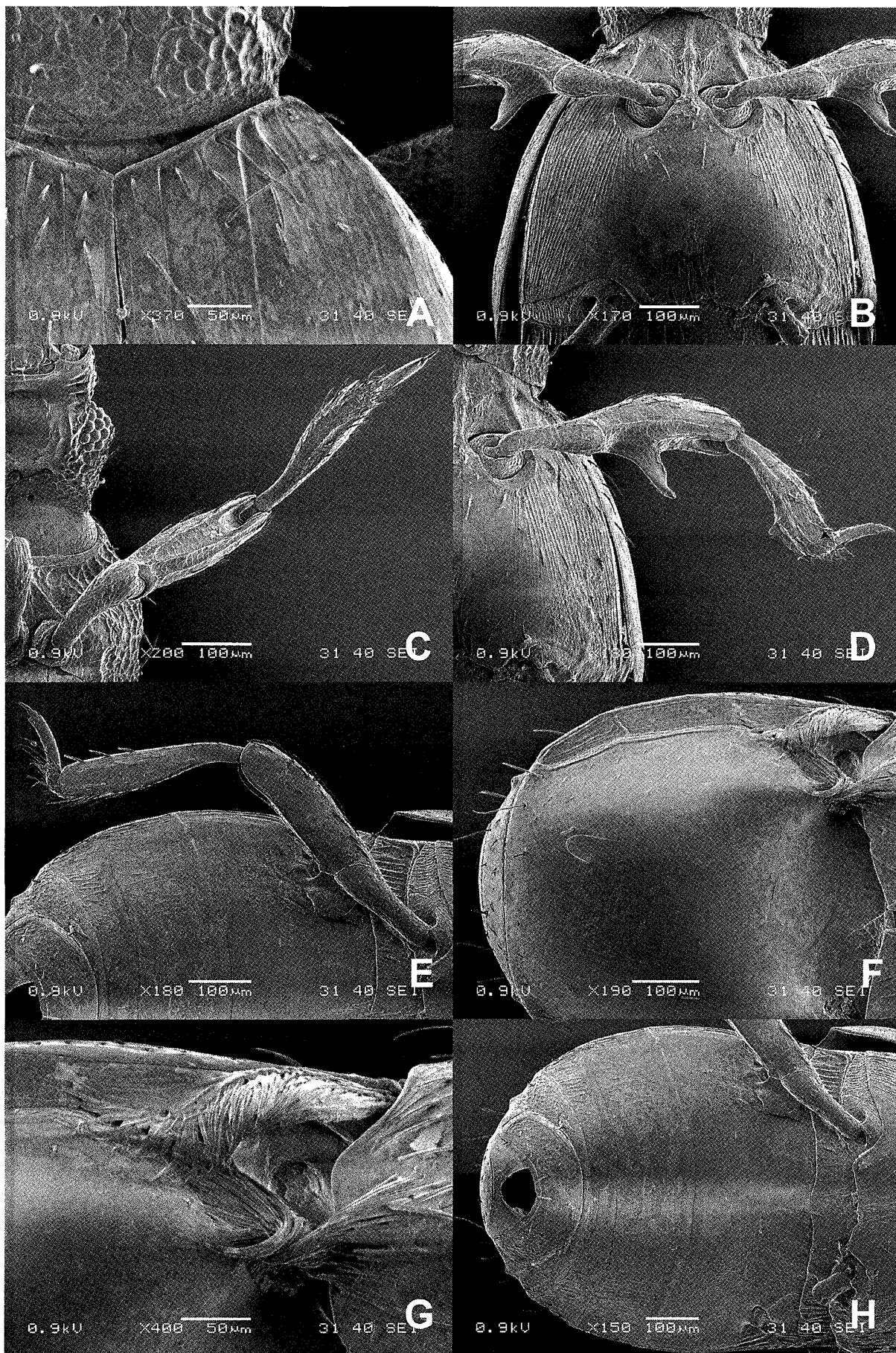
**Etymology.** This species is dedicated to a Vietnamese dipterologist, Dr. Ta Huy Thinh for his kind assistance in the author's fieldworks in Vietnam.

Holotype male, Mt. Tam Dao (950 m), by FIT, Vinh Phu Prov., N-Vietnam, 13–21. v. 2003, S. Nomura leg. (NSMT).

**Male.** Body (Fig. 1A) length 1.98 mm, width 0.71 mm, elongate, narrowed in head and pronotum, color reddish brown and shiny.

Head (Fig. 2A–D) widest at anterior margin of genae and just behind eyes, weakly convex, irregularly reticulate on dorsal surface; clypeus gently projected anteriad; frons convex, weakly narrowed just before eyes, strongly narrowed anteri-

Fig. 3. *Microdiartiger thinhi* sp. nov., male. A, Elytra enlarged; B, meso- and metathoraces in ventral view; C, left fore leg in ventral view; D, left mid leg in ventral view; E, right hind leg in ventral view; F, abdomen in dorsal view; G, ditto, basilateral part enlarged; H, ditto, in ventral view.



ad to form a short longitudinal carina in anterior part; vertex weakly convex, with a pair of strong, round dorsal tentorial pits just above eyes; genae strongly concave behind antennal bases. Eyes each composed of about 25 facets. Antennae (Fig. 2E, F) 0.40 mm in length; segment I very short, annular, invisible in dorsal view; II slightly longer than I, as wide as I, broadened apically; III about twice as long as wide, weakly thickened apicad, with short, thick setae in apical part; IV largest, longer than I+II+III, 2.4 times as long as wide, subcylindrical, sparsely covered with short setae in lateral surface; relative length (width) of each segment to width of segment I: 0.8(1.0):0.8(1.0):2.2(1.2):4.0(1.7). Mouthparts small; labrum very small, wider than long, shallowly emarginate on anterior margin; mandibles very small, triangular in anterior view; maxillary palpi short, fusiform in apical part, with a group

of short setae at apex.

Pronotum slightly larger than head, slightly longer than wide, widest at anterior 2/5, then narrowed anteriorly, with a pair of basilateral foveae at posterior 1/4, with a shallow median longitudinal groove in basal 2/3 on dorsal side. Meso- and metasterna very large, gently convex, almost smooth on middle part, with a group of small setae in posteromedian part, densely covered with linear microsculpture on lateral sides. Elytra weakly convex, sparsely with thick setae; each elytron with a basal fovea at middle of anterior margin, with adsutural and median carinae in its full length, with lateral carina extending from basal fovea to posterior 1/3, with short trichome at middle of posterior margin. Legs short, stout; mid femora thick in base, weakly narrowed apicad, each with a large, triangular spine on posterior side at base; mid tibiae narrow at base, weakly

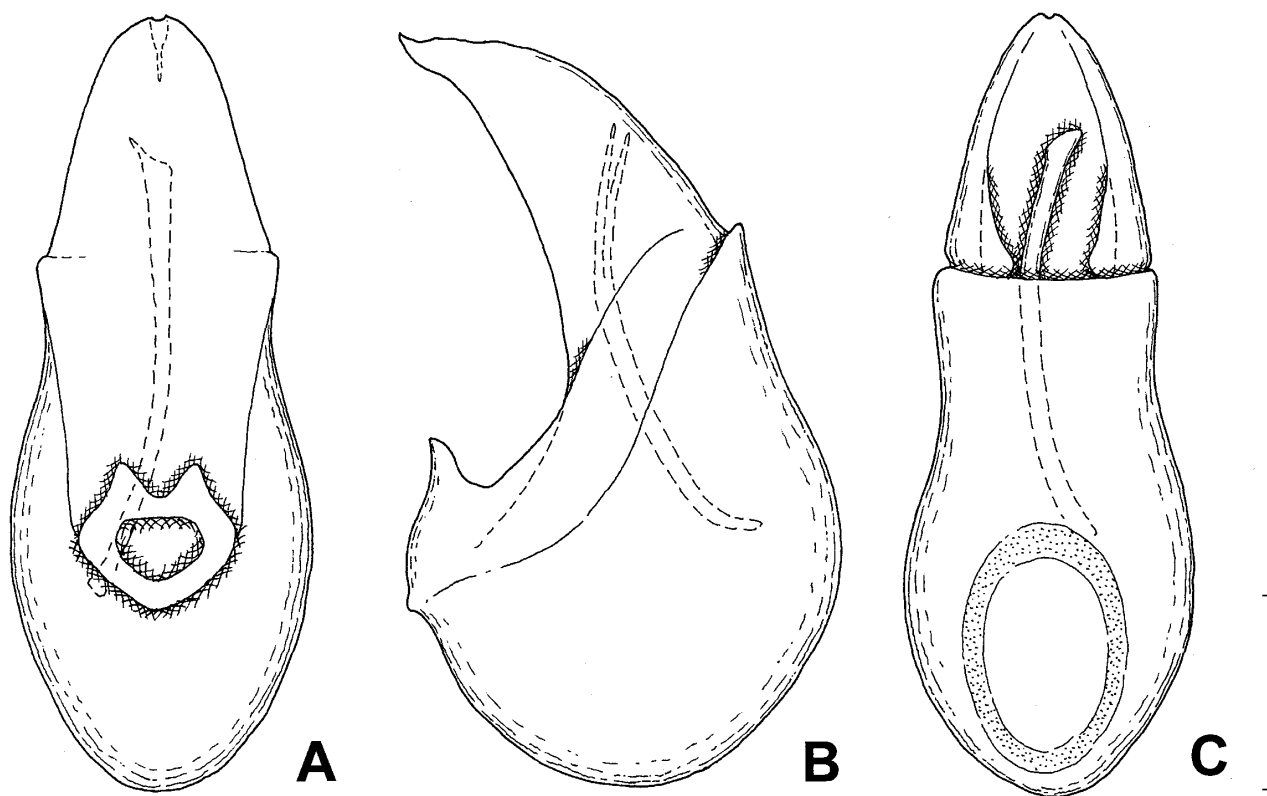
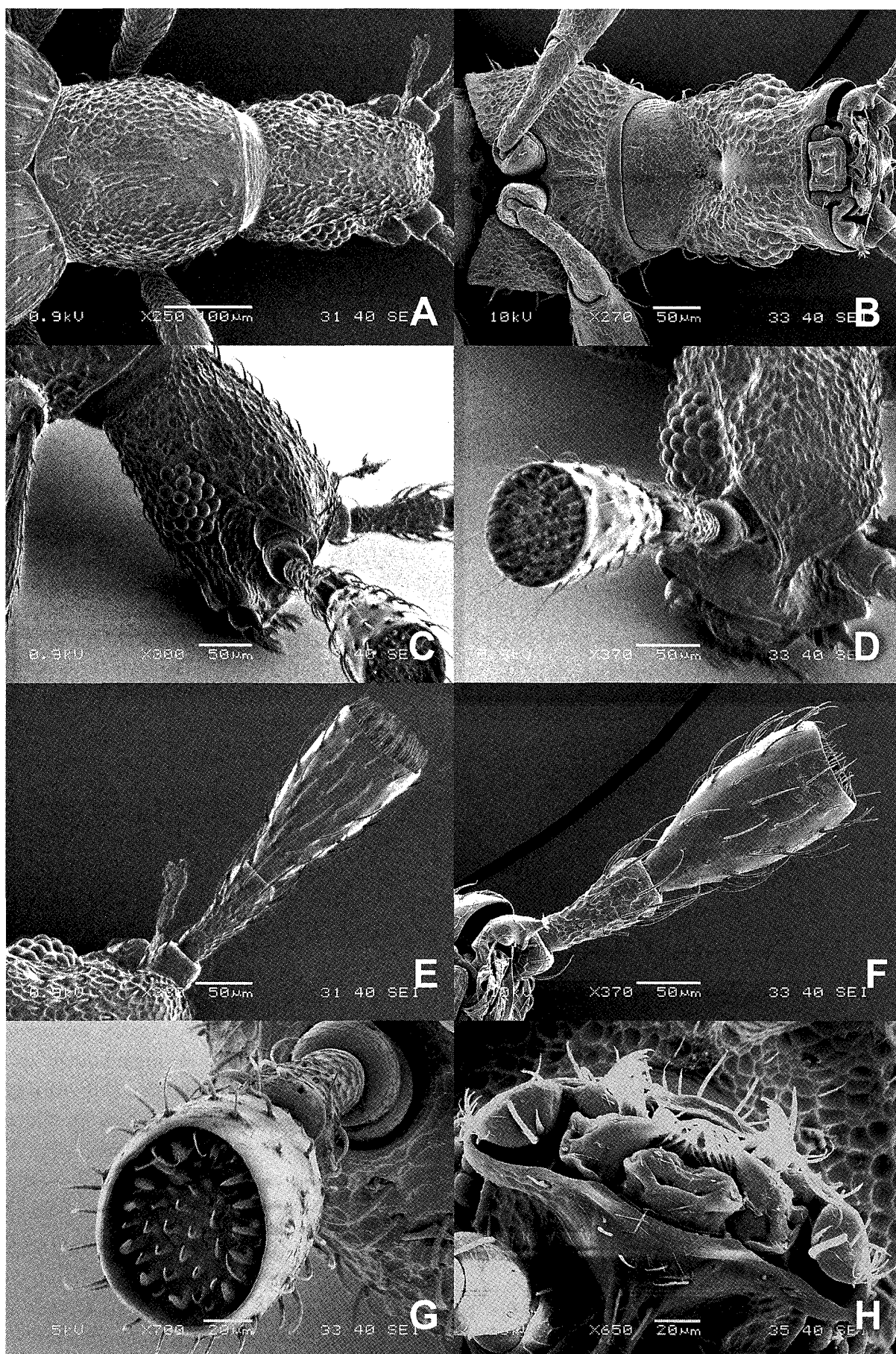


Fig. 4. *Microdiartiger thinhi* sp. nov., male genitalia. A, Ventral view; B, lateral view; C, dorsal view.

Fig. 5. *Microdiartiger japonicus* K. Sawada, male. A, Head and prothorax in dorsal view; B, ditto, in ventral view; C, head in lateral view; D, ditto, in anterior view; E, left antenna in dorsal view; F, right antenna in ventral view; G, ditto, apical part enlarged; H, mouthparts in anterior view.





broadened apicad, each with a very short denticle at apical 1/4 on inner side.

Abdomen longer than elytra, slightly wider than long, sparsely covered with short, thick setae in posterior part; composite tergum strongly concave in basimedial part, with a pair of short oblique trichomes just behind elytral trichomes, with a pair of basilateral foveae just outside of trichomes; paratergites IV to VI well demarcated; IV elongate, widest, with a large semi-circular trichome in basal part; V about as long as IV, slightly narrower than IV, elongate, quadrangular; VI slightly shorter than V, elongate, triangular; tergite VII short, transverse, sparsely with thick erect setae; VIII small, nearly triangular in posterior view; sternites III to VIII feebly convex; III short; IV largest, about three times as wide as long; V 0.6 times as long as IV, covered with linear microsculpture on lateral sides; VI short, with linear microsculptures on lateral sides; VII very short in middle part, about as long as VI in lateral parts, densely covered with minute reticulation; VIII short, transverse, nearly U-shaped, with a pair of short, thick setae at posteromedian part, densely covered with minute reticulation on lateral sides.

Male genitalia (Fig. 4) weakly sclerotized; basal bulb ovoid, strongly narrowed distad, with well projected basal foramen on ventral side; apical part strongly narrowed, ventrally curved toward apex; endophallus with a very long and slender sclerite; the sclerite slightly curved, feebly broadened and bifurcate at apex in lateral view.

*Female.* Unknown.

*Distribution.* Vietnam (Mt. Tam Dao).

*Remarks.* This new species resembles the type species, *M. japonicus* K. Sawada in having the short and thick antennae, the pronotum with short and thick suberect setae, the elytra covered with linear microsculpture, and the similar structure of the male genitalia. However, it is easily

separated by the large body and the composite abdominal tergum with broad basimedial concavity and the oblique trichomes (narrow basimedial concavity and transverse trichome in that of *M. japonicus*).

***Microdiartiger japonicus* K. Sawada, 1964**

[Japanese name: Hime-higebuto-arizukamushi]

(Figs. 1C, D, 5–7)

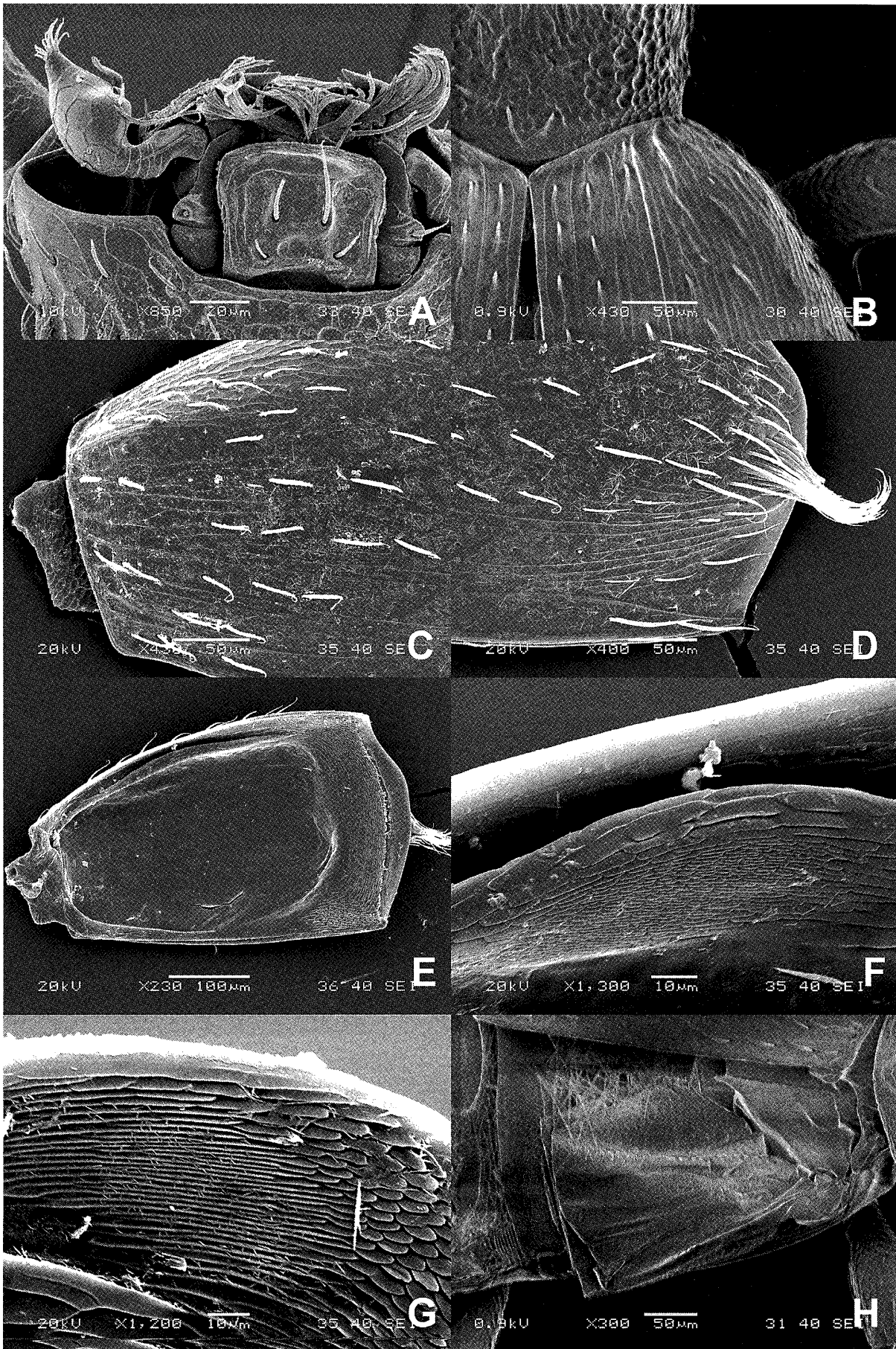
*Microdiartiger japonicus* K. Sawada, 1964: 13 (Type locality: Mt. Makinoo-san, Osaka Pref.); Besuchet, 1986: 263; Nomura, 1989: 293; 1997: 91; 1999: 190.

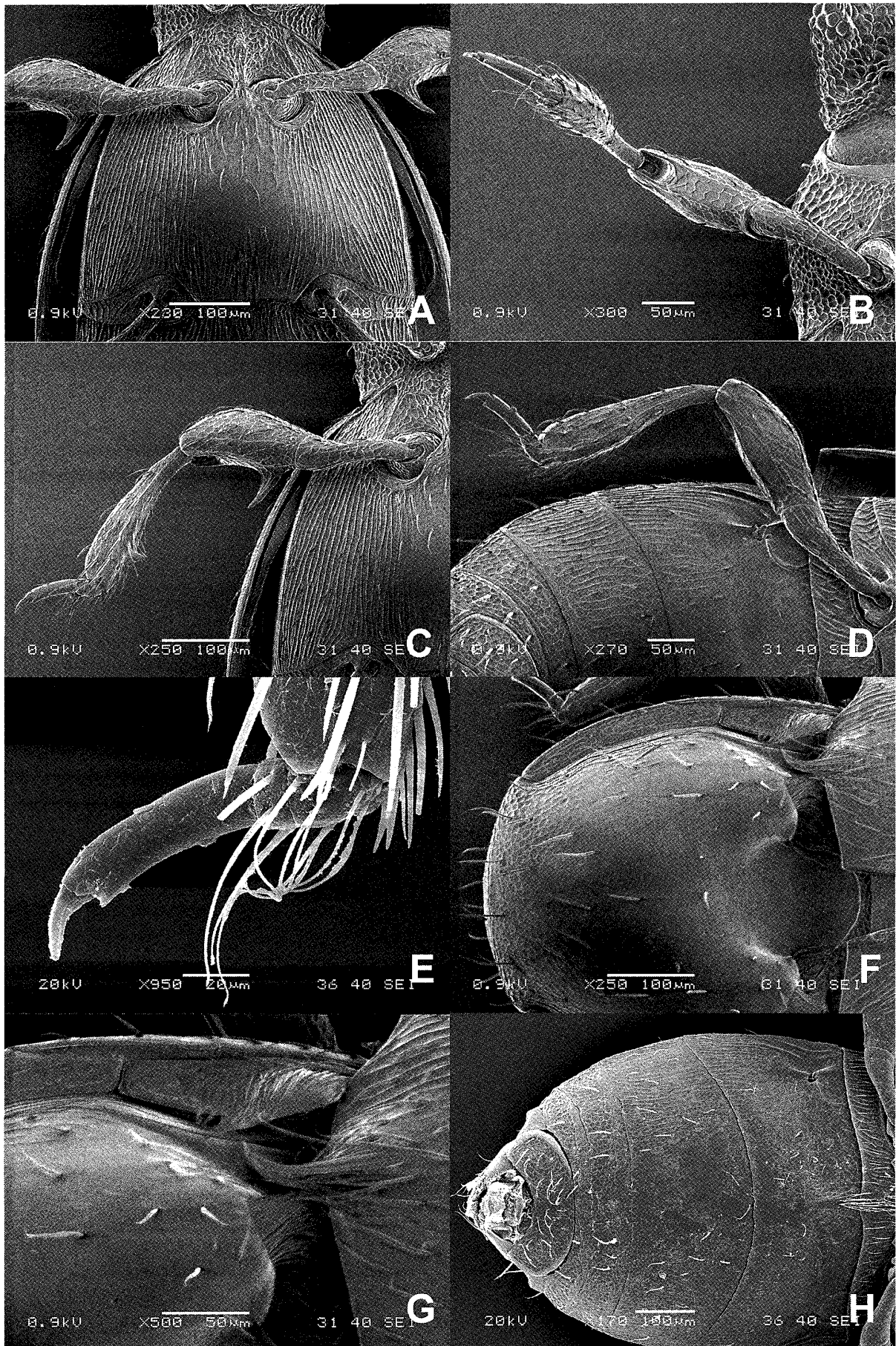
*Specimens examined.* 1 female, Hiekawa, Shizuoka Pref., 25. vii. 1996, YR. Sawada leg. (NSMT). See Nomura (1997, 1999) for the data of other specimens.

*Male.* See Nomura (1997) for the general characters except for the microstructure observed by SEM shown below: head and pronotum rugosely sculptured, sparsely covered with thick suberect setae on dorsal and lateral surfaces; antennal segments II to III reticulate; IV smooth on lateral sides; mouthparts less reduced than in *Diartiger*; labrum short, transverse, narrowly emarginate at middle on anterior margin, with a transverse sulcus at middle; mandibles shortened, each with a short denticle and a fovea at external part; maxillary palpi elongate, each nearly fusiform in apical part, with two thick setae on ventral side; labium transverse, with very short and unisetose labial palpi and quadrate mentum with two pairs of setae at basimedial part; elytra densely covered with linear microsculptures, sparsely with large recumbent setae, with a deep longitudinal sulcus and a longitudinal carina along outer margin on inner side (Fig. 6F), with an indistinctly demarcated stridulatory file just inside posterolateral corner on inner side (Fig. 6G); hind wing developed (Fig. 6H); metasternum densely covered with longitudinal linear microsculptures; composite tergum of abdomen

Fig. 6. *Microdiartiger japonicus* K. Sawada, male. A, Mouthparts in ventral view; B, elytra, basal part enlarged; C, ditto, basal part; D, ditto, apical part; E, ditto, in ventral view; F, lateral carina of elytra, enlarged; G, stridulatory file (?) on elytra, enlarged; H, right hind wing in dorsal view.







large, almost smooth in median part, reticulate in posterior part; sternites III to V densely covered with linear longitudinal microsculpture on lateral sides; VI to VIII each densely with reticulation as a whole.

*Distribution.* Japan (Honshu, Shikoku, Kyushu).

*Remarks.* This species is characterized by the small body (1.38–1.49 mm in the male, 1.50–1.58 in the female in length), the composite abdominal tergum with a narrow basimedial concavity and a pair of large transverse basilateral trichomes, and the male sexual characters of the mid legs.

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Fig. 7. *Microdiartiger japonicus* K. Sawada, male. A, Meso- and metathoraces in ventral view; B, right fore leg in ventral view; C, right mid leg in ventral view; D, right hind leg in ventral view; E, right hind tarsus in ventral view; F, abdomen in dorsal view; G, ditto, basilateral part enlarged; H, ditto, in ventral view.